

Claims

1. A method for positioning when replacing anodes in an electrolysis cell of Hall-Hérault type with prebaked anodes, in which a crane with an anode gripper is used to lift out used anodes and to insert new anodes, the gripper act in a predetermined, fixed point in the hanger of the anodes, and in which a new anode is inserted at a height in accordance with a calculated height based on the height of the anode removed, the height of the anode removed and the height of the new anode being measured against a common reference level,  
characterised in that laser-based measuring equipment for length measurements is arranged between a point on the crane, which is stationary in terms of height during the operation, and a point on the anode gripper, which moves together with the anode, that the equipment measures the heights stated and that the measured values are processed by a PLC-based system, which determines the insertion height of the new anode in accordance with a specific algorithm.

2. A method in accordance with claim 1,  
characterised in that the algorithm comprises the following formula:  
$$D=A-B+C-X,$$
where:  
D is the desired position of the new anode.  
A is the position of the used anode in the cell.  
B is the position of the used anode on the reference level.  
C is the position of the new anode on the same reference level.  
X is the additional height for insertion of the new anode in relation to the used anode.

3. A method in accordance with claim 1,  
characterised in that, before the height stated is measured, play is eliminated in the anode gripper and connected mechanical structures in the crane by the anode gripper being subjected to a first lifting force that is less than the weight of the burned-out anode.

4. Equipment for positioning when replacing anodes in an electrolysis cell of Hall-Hérault type with prebaked anodes, comprising a crane with an anode gripper to lift out used anodes and to insert new anodes, the gripper acts in a predefined point of the anode's hanger, with which a new anode is inserted at a height in accordance  
5 with a calculated height based on the height of the anode removed, the height of the anode removed and the height of the new anode being measured against a common reference level,

characterised in that

laser-based measuring equipment for length measurements is arranged between a  
10 point on the crane, which is stationary in terms of height during the operation, and a point on the anode gripper, which moves together with the anode, and that the equipment measures the heights stated and transfers the data signals to a PLC, which processes measured, saved values and determines the insertion height of the new anode in accordance with a specific algorithm.

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5. Equipment in accordance with claim 4,

characterised in that

the laser-based measuring equipment comprises a laser cell, which both emits laser light and detects reflected laser light and which is mounted at a location that is  
20 stationary in terms of height on the crane and that a reflective device for reflection of the laser light is mounted on the anode gripper.

6. Equipment in accordance with claim 5,

characterised in that

25 the laser cell is contained in a dust-tight cabinet with a downward-facing opening, to which is attached a tube through which the laser light passes.

7. Equipment in accordance with claim 6,

characterised in that

30 the cabinet is supplied with compressed air to establish air overpressure so that dust cannot reach up into the cabinet via the tube.

8. Equipment in accordance with claim 7,  
characterised in that  
the PLC is arranged so that the measured values transferred are stored and  
5 processed after interlocking to eliminate play.
9. Equipment in accordance with claim 8,  
characterised in that  
the interlocking involves the anode gripper being subjected to a lifting force  
10 equivalent to 60-70% of the weight of the anode, and that this must be applied for at  
least 2 seconds before the measurement can be stored.
10. Equipment in accordance with claims 8-9,  
characterised in that  
15 a display, a light signal or similar visualises the completion of the sequence in  
accordance with the method and interlocking specified, and that measured values  
are saved in accordance with this.